five of the languages under one alphabet, and the Russian under another. The general arrangement and the ground covered by each volume, leave nothing to be desired, and this dictionary will prove invaluable to all those who are engaged in technical work. Repeated tests of both volumes show that practically nothing has been omitted, and the long lists of contributors and revisers for the two volumes, embracing men eminent in the railway world in Europe and America, are a sufficient guarantee of the accuracy of the work. The great difficulty which often arises of finding a definition in one language which should have its exact equivalent in another has been very satisfactorily overcome, and the sketches render misunderstandings almost impossible.

In the volume dealing with railway construction and operation, only those terms are included which are of general importance in such work; such details as earthworks, bridge-construction, &c., could only be exhaustively treated in volumes specially reserved for them. Nevertheless, the railway expert will find that such subjects have been quite adequately treated so far as he is concerned in this volume. In preparing this volume, the subject has been divided into sections to facilitate reference; these sections include track, permanent-way, connections between tracks, stations, signalling, and safety appliances, railway service, &c., and one special section has been given to electric railway installations. Each section is again divided into a large number of subsections, and, as these are given fully in the table of contents, it will be realised how much care has been taken to facilitate reference. It is essential to those who are engaged in the work of translating or making extracts from foreign technical books and journals that any technical dictionary should be so arranged that no time should be lost in ascertaining the ordinary English equivalents to any unknown foreign words or expressions; the alphabetical index at the end of each volume ensures this, and the division of the whole subject into sections and subsections still further makes for simplicity and saving of time.

The sixth volume is given up entirely to the important subject of railway rolling stock. Here, again, the subject is divided up into a series of sections, such as common equipment for locomotives and carriages, including such details as wheels, axles, drawbar and buffer gear, brakes, &c.; locomotives and motor coaches; carriages; systems of lighting trains; rolling stock for electric railways; and, lastly, railway workshops. This latter section is not, of course, intended to cover the subject of machine tools generally, but only in so far as special methods and working are employed in railway workshops.

With the help of these two volumes, the railway engineer, and all those who are concerned with the various industries which are devoted to the manufacture of the machinery and plant required for the working and upkeep of the railways of the world, will find that the task of keeping abreast of what is being done in other countries will be greatly facilitated. It is essential that every manufacturing firm should endeavour to learn from the technical Press what is being done in other lands, and a thoroughly trustworthy technical dictionary, such as this series now in course of publication, is indispensable for this purpose. These volumes should be found in the head office of every firm which aspires to keep itself up to date in business methods. T. H. B.

PHYSICAL CHEMISTRY IN ITS GEOLOGICAL APPLICATIONS.

Principles of Chemical Geology: a Review of the Application of the Equilibrium Theory to Geological Problems. By Dr. J. V. Elsden. Pp. viii+222. (London: Whittaker and Co., 1910.) Price 5*s.* net.

ALTHOUGH it is generally recognised that the new physical chemistry has far-reaching applications in geology, no less than in other branches of science, little has yet been done to bring this home directly, either to the working geologist or to the student. In Van 't Hoff's lectures on "Physical Chemistry in the Service of the Sciences," the only geological application discussed is that relating to the crystallisation of salts from sea water. The results of the chemist's beautiful investigation of this one problem are the first-fruits of work on these lines, and they serve to show how wide a field still remains to be harvested. Vogt and others have essayed to apply the laws of solutions to igneous rock-magmas, but in this much more difficult problem no more than a beginning can yet be recorded. Meanwhile, we suffer from that want of touch between workers in different branches of science which is one of the less happy consequences of specialisation. The chemist has, in most cases, little acquaintance with geological questions, while the geologist, of the older generation at least, has not usually a working knowledge of physical chemistry, or at best is unfamiliar with the specific results which have been obtained.

This gap Dr. Elsden has now endeavoured to fill. The book before us is a compendium of physico-chemical principles as applied to the more important questions of chemical geology and petrology. In accordance with this plan, the arrangement adopted is primarily a chemical one, thus differing from the older method of Bischof and others. Successive chapters deal with the crystalline and amorphous states, viscosity, diffusion, solution, surface-tension, vapour-pressure, polymorphism, and mix-crystals. Throughout the author insists that the key to the many problems here touched "lies in the determination of the conditions of equilibrium," and indeed this last word occurs in the heading of almost every chapter. Unfortunately, as is duly recognised, many geological phenomena (such, *e.g.* as the glass in volcanic rocks) prove that the adjustment of equilibrium may be indefinitely delayed.

A surprising amount of matter is brought together in the compass of these two hundred pages, and the numerous references given in footnotes will be very useful to the student. Sometimes, perhaps, this fulness is gained rather at the expense of clearness of treatment; or it may be merely a wholesome caution which makes the author content to cite conflicting opinions and leave the question at issue open. In

general, we are given an admirable, if condensed, summary of the subjects dealt with, though in places a critic may pick out a carelessly written sentence, *e.g.* the dictum (p. 2) that "no substance can at once possess both vectorial and scalar properties." Any work treating of a new and rapidly developing subject must inevitably contain statements which have become obsolete even before their publication, and in a second edition Dr. Elsden will doubtless revise such passages as those relating to quartz and tridymite (p. 104), amphibole and pyroxene (pp. 111 *et seq.*), and lime-olivine (p. 203). Meanwhile, the book, in addition to its intrinsic value, will attain the author's expressed desire to stimulate interest in this important branch of geology. A. H.

THE MAKING OF GARDENS.

Hardy Plants for Cottage Gardens. By Helen R. Albee. Pp. vi+309. (New York: Henry Holt and Company.) Price 1.60 dollars net.

THIS volume forms part of the American Nature Series: Group iv., Working with Nature. From the title one would expect to find the work severely technical and somewhat dull—"dull and useful as work clothes and garden boots," as the author herself describes a certain chapter. But the title, though appropriate for a section of the work, is to some extent inadequate, as the book proves to be an essay on garden-making, written in a light and racy style, reminiscent of Charles Dudley Warner's delightful "My Summer in a Garden."

The greater part of the volume is devoted to a detailed account of the evolution of the author's garden, through the various stages "In the beginning," "An incipient garden," "The garden grows," "My ambition grows," and gliding on by easy transition to such apparently inconsequent subjects as "the vices of plants" and "some gardeners I have known." But though the author in her narrative of the six years' labour involved in the formation of her garden ranges over a wide field of horticultural economy, the sequence is so easy and natural that the reader's interest is not allowed to flag, and it is with regret that one reaches the classified lists which occupy the last 122 pages of the book.

These lists are conventional, and call for little comment. The method of classification adopted, though at first sight somewhat complex, will probably facilitate reference. The lists comprise a selection of shrubs and perennials, with descriptions and brief cultural directions, and are arranged primarily under colour headings, and, secondarily, according to the months in which the plants flower. A selection of annuals arranged according to the same system follows. It may be pointed out that this might have been incorporated with the shrubs and perennials, thereby avoiding a somewhat bewildering multiplicity of headings. The work is profusely illustrated with views of the author's garden at various stages, and a copious index is provided.

The author has not laid down hard and fast rules for the formation of a flower garden. Nor does she desire that others should follow slavishly the lines on which she has worked. "It is not well to imitate another's work, but to follow where your own conditions lead." Her experiences are related with a view to stimulating others who may have the opportunity and the desire to create a garden after their own heart, but who may lack the courage to break away from the conventional or who are diffident as to their ability to shape a new course for themselves. By such the book will be found rich in suggestion. Above all is it a plea for the free play of imagination in the garden.

"No one should have a garden which grows nothing but flowers, and yields no other recompense to the gardener except successful plants. Over, beyond, and above must hover the spirit of poetry, of wonder, of mystery; otherwise there comes a day of disillusion when you awaken to the weariness, anxiety, and watchfulness, and begin to measure the reward. You need a larger insight, something that connects your efforts with the universal in nature, the ideal, the soul of things. Into this you may lift the garden, and at once drop the tired body and soiled hands, and the whole material aspect of labour."

PHARMACEUTICAL PRACTICE.

The Extra Pharmacopoeia of Martindale and Westcott. Revised by Dr. W. Harrison Martindale and W. Wynn Westcott. Fourteenth edition. Pp. xxvii+1054. Price 12*s.* net. With supplement, *Organic Analysis Chart.* By W. H. Martindale. Pp. 80. (London: H. K. Lewis, 1910.) Price 3*s.* 6*d.* net.

THIS handbook, which is so familiar to medical and pharmaceutical practitioners, appears in its fourteenth edition in a slightly altered form, the size of the pages having been enlarged so as to allow of the inclusion of new matter without increasing the thickness of the book. It will, however, still fit comfortably in the coat pocket, which is not an altogether unimportant advantage.

The two years that have elapsed since the appearance of the thirteenth edition have yielded an unusual amount of valuable therapeutic literature, a judicious condensation of which forms, for the most part, the new matter of the fourteenth edition. There are new chapters upon lactic acid bacilli therapy, organic arsenic compounds, the electrical introduction into the tissues of medicaments in the ionised condition, and radiology. In addition, the most recent information relating to a number of new pharmaceutical and chemical preparations is incorporated, and recent progress in vaccine therapy, cancer research, trypanosomiasis, and the treatment of tuberculosis is noted. The results of the chemical and bacteriological inquiry into the value of disinfectants undertaken by *The Lancet* commission are summarised.

The above is a brief outline of the extent of the revision in so far as it is of direct interest to the medical practitioner, but it may be added that throughout the book there is evidence that the authors have scrupulously followed the medical literature of the past two years. Alterations which enhance the usefulness of the book to pharmacists are by no means inconspicuous. Details are given of about a hundred more patent or proprietary medicines than in the last